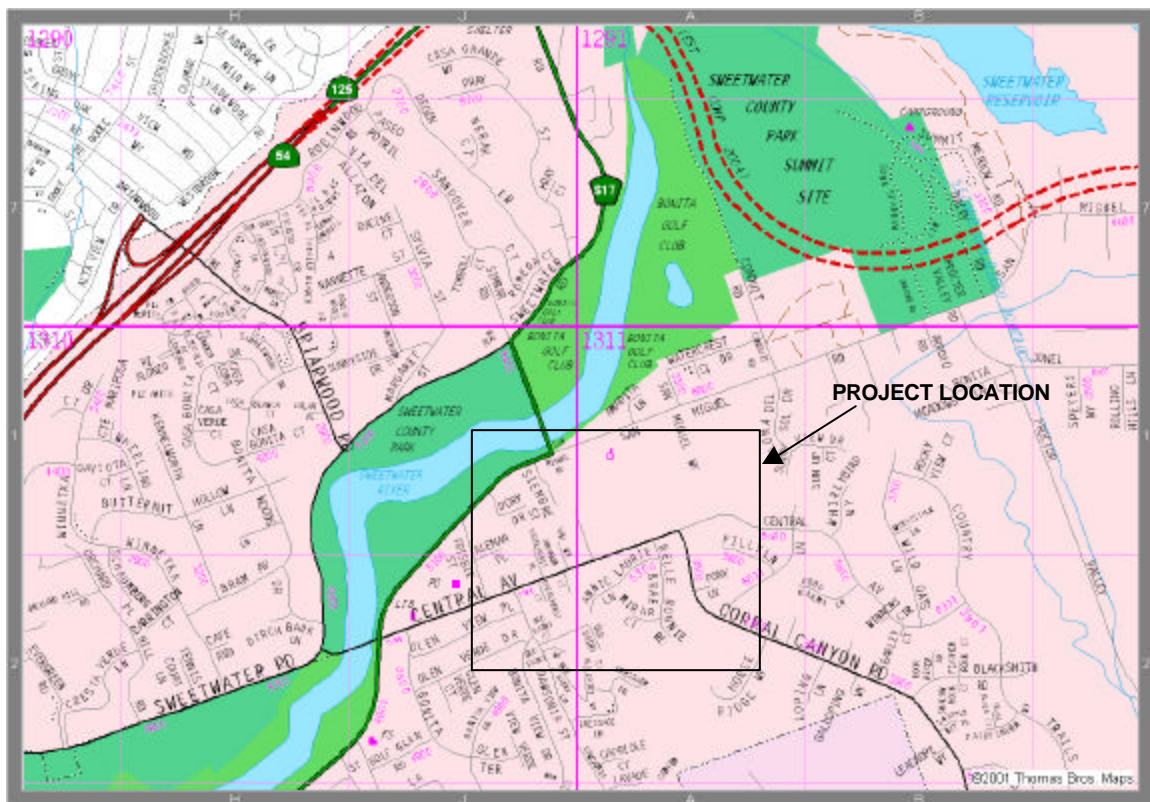


# PRELIMINARY ENGINEERING REPORT

## Central Avenue Channel Improvements Between Dawsonia Street and Corral Canyon Road

County of San Diego  
Department of Public Works  
July 2002 (Final)



Vicinity Map

**CENTRAL AVENUE CHANNEL IMPROVEMENTS  
BETWEEN DAWSONIA STREET AND CORRAL CANYON ROAD  
PRELIMINARY ENGINEERING REPORT**

**Supervisor Greg Cox  
District One**

**Department of Public Works Staff**

**Douglas Isbell, PE, Deputy Director  
Joe McDivitt, PE, DPW Manager  
Mark Perrett, PE, Project Manager  
Kent Burnham, PE, Project Engineer**

**July 2002 (Final)**

## TABLE OF CONTENTS

<b><u>SECTION</u></b>	<b><u>PAGE</u></b>
1. Introduction	1
2. Background	1
3. Need and Purpose	3
4. Other Considerations	3
5. Alternatives	5
6. Funding	12
7. Opinion of Probable Project Cost	12
8. Schedule	13
9. Recommendation	14
10. Project Personnel	15

Appendix A	Budgetary Opinion of Probable Construction Costs
Appendix B	Existing Conditions and Proposed Alternatives (Drawing Sheets 1 – 6)
Appendix C	Hydrology and Hydraulic Calculations
Appendix D	Reference Drawings

## **1. INTRODUCTION**

RBF Consulting was retained to prepare a Preliminary Engineering Report for the proposed improvement of drainage conditions of Central Avenue between Dawsonia Street and Corral Canyon Road. The proposed improvements are intended to alleviate the existing flooding along Central Avenue in addition to existing residences east of Dawsonia Street and at the end of Audubon Court (see Appendix "B"). Five alternatives were considered in this analysis as described in the "Alternatives" section of this report.

## **2. BACKGROUND**

### **? Project History**

During large storms, Central Avenue has a long history of flooding problems. Specifically, an existing earthen channel on the North side of Central Avenue west of Belle Bonnie Brae Road becomes inundated by runoff and floods the adjacent properties to the north (see Appendix "B"). Furthermore, the existing drainage facility that conveys the overflowing earthen channel across Central Avenue also has a history of flooding during large storms.

In 1989, the County of San Diego replaced five (5) existing 48-inch corrugated metal pipes (CMP's) under Central Avenue with a triple box concrete culvert (see Appendix "B"). This repair was more of a maintenance improvement, but it did include a concrete apron and headwall to maximize the inlet opening capacity (see Appendix "B"). Since Central Avenue is on continuous grade in the vicinity of the Central Avenue channel crossing, the overflowing runoff continues in a westerly direction flooding the traveled way and additional properties along the busy road.

In addition to the flooding along Central Avenue, the existing earthen channel southwest of the Central Avenue crossing has a history of flooding adjacent properties. Specifically, the residences at the southern end of Audubon Court experience flooding during large storms. In 1989, some minor improvements were made to the existing channel as a condition the Bonita Highlands subdivision. The channel improvements included grading the channel to an increased base width of 56'. The channel was graded to a form a trapezoidal channel with 1.5:1 concrete sideslopes (see Appendix "D"). From a review of record documents, the improvement plans stated the need for a parapet wall on the northern bank to contain the runoff from large storms. According to field investigations, the proposed parapet wall was never constructed, and the northern channel bank is noticeably lower than the more recently improved subdivision on the southern channel bank.

### **? Community Interaction**

According to the Department of Public Works, the local residences have complained about the flooding along Central Avenue. In addition, the residences near the end of Audubon Court are concerned about future flooding due to

proposed development upstream of their properties. No community meetings regarding the drainage issues have been held at this time.

? **Existing Facilities**

***Central Avenue***

Central Avenue is currently paved to partial width in the vicinity of the channel crossing. The street runs in an east – west direction and varies in paved width from 28' immediately west of the crossing to 42' immediately east of the crossing.

The right-of-way for Central Avenue varies from 60' wide to 72' wide west and east of the channel crossing, respectively. According to the County of San Diego Annual Report, Central Avenue is classified as a Collector Urban (CU) road and is paved with asphalt concrete with a level gradient up to 1.0%. The existing improvements vary in the vicinity of the project. The edge improvements vary from full curb, gutter, and sidewalk improvements on the south side of Central Avenue to asphalt berm (only) on the north side.

***Drainage Channel***

Regarding the drainage channel, many independent improvements have occurred over the years as stated in the previous section (see Project History). Downstream of Dawsonia Street the channel is a concrete lined trapezoidal channel approximately 6.6' deep with 1.5:1 sideslopes (see Appendix "B"). Immediately upstream of Dawsonia Street the channel is an unlined natural channel of varying widths and sideslopes (see Appendix "B"). In the vicinity of Audubon Court, the channel constricts briefly. Upstream of Audubon Court, the channel was partially improved to a trapezoidal channel with a natural bottom and 1.5:1 concrete sideslopes. This channel sections continues approximately 650 feet until the channel continues toward the Central Avenue crossing.

As previously mentioned in the Project History, the channel crossing at Central Avenue includes a concrete box culvert to convey runoff under the street. Records indicate that the culvert is a 10' X 5' triple box culvert approximately 75' in length. The channel crossing includes a concrete apron and headwall on the upstream side to maximize the inlet opening capacity (see Appendix "B").

Upstream of the Central Avenue crossing, the channel is a small unlined natural channel approximately 3' deep with varying sideslopes (see Appendix "B"). Three existing properties access Central Avenue over this portion of the channel including Sunnyside School. The two private residences have concrete channel crossings for vehicular traffic and Sunnyside School has a concrete pedestrian bridge for students (see Appendix "B").

Upstream of the pedestrian bridge crossing, a large storm drain pipe with concrete energy dissipator is located on the north side of Central Avenue (see Appendix "B"). According to record drawings this storm drain is a 66-inch RCP storm drain and discharges runoff from the Bonita Highlands subdivision located south of Central Avenue.

### ***Utilities***

Utility poles with overhead utility lines are located east of the Central Avenue channel crossing. Specifically, the utility lines are located between the small natural channel and Central Avenue. In addition, water laterals with meters and sewer laterals cross under the channel to provide services to the existing residences (see Appendix "B").

It should be noted that no known environmental studies exist of this area, and that it is probable that an archeological survey will not be required since the area has been significantly impacted.

## **3. NEED AND PURPOSE**

The existing drainage channel between Dawsonia Street and Corral Canyon Road is currently a combination of improved channel, partially improved channel, and natural channel. Over the years, the County of San Diego and private developers have made improvements to the existing drainage channel. During large storms, the existing channel is overloaded by runoff for a number of reasons. A hydrology study has been completed that indicates the existing channel is grossly under capacity to handle the 100-year storm frequency in some locations.

In order to address the flooding problems in the vicinity of Central Avenue, a comprehensive Preliminary Engineering Report (PER) is required to analyze the existing improvements to the channel and to understand the many possible causes for flooding in the area. In addition, the PER should compile logical improvement alternatives and recommendations for solving the existing flooding problems.

## **4. OTHER CONSIDERATIONS**

### **Hazardous Waste**

There is no information on any identified hazardous waste sites in the area under consideration

### **Right-of-Way Issues**

Road right-of-way acquisition along Central Avenue is anticipated and required for all of the proposed improvement alternatives. In addition, partial lot acquisition may be required for a proposed detention basin. A brief description of land acquisition requirements for different alternatives follows.

### ***Alternative 1 - (3,650 CFS Design Q)***

Alternative 1 will require approximately 70 feet of additional right-of-way on the north side of Central Avenue east of the existing channel crossing (see Appendix "B"). The additional right-of-way is required for widening the existing drainage channel.

### ***Alternatives 2 and 3 - (600 and 1,600 CFS Design Q, respectively)***

Due to the extremely large detention basin requirements for these alternatives a right-of-way acquisition analysis was not performed.

### ***Alternative 4 - (3,000 CFS Design Q)***

Alternative 4 will require approximately 60 feet of additional right-of-way on the north side of Central Avenue east of the existing channel crossing (see Appendix "B"). In addition, many parcels will be encroached by a proposed detention basin for this alternative. Consequently, land acquisition may be required over many individual private lots for grading and large storm runoff detention.

### ***Alternative 5 - (1,800 CFS Design Q)***

Alternative 5 will require approximately 35 feet of additional right-of-way on the north side of Central Avenue east of the existing channel crossing (see Appendix "B"). In addition, many parcels will be encroached by a proposed detention basin for this alternative. Consequently, land acquisition may be required over many individual private lots for grading and large storm runoff detention.

## **Environmental Issues**

There are several possible environmental issues in the vicinity. Vegetation within the existing drainage channel is extensive. In addition, Central Avenue is a collector urban road, and any of the proposed alternatives that affect traffic (temporary or otherwise) will have an adverse effect on circulation. A review by Environmental Services may be required to assess impacts on the existing vegetation and traffic circulation that may be affected during construction.

## **Drainage**

As previously described in the Existing Facilities section of this report, the existing drainage channel between Dawsonia Street and Corral Canyon Road is a combination of improved and natural channel. The tributary area of the drainage basin for the channel is approximately 5.75 square miles according to a hydrology study performed by Nolte Associates (see Appendix "D"). According to the Nolte study, the existing drainage channel collects runoff from the north, south, and east of Dawsonia Street. The channel basin extends as far east as the perimeter ridges of Sweetwater Reservoir.

In addition to drainage from the east, an existing 66-inch drainage pipe discharges flow from the residential subdivision south of Central Avenue. This storm drain system includes a concrete energy dissipator, and runoff from this system joins the existing channel at a confluence point north of Central Avenue.

In addition to runoff from the east, the existing channel west of the Central Avenue channel crossing has several other drainage pipes that convey runoff from adjacent developments. Although these areas add to the channel runoff, the majority of the tributary area is located east of Corral Canyon Road.

## **5. ALTERNATIVES**

Below is a description of each alternative as considered and analyzed in this report. A summary of the proposed alternatives is at the end of this section.

### ***Alternative 1 - (3,650 CFS Design Q)***

Alternative 1 fully conveys the peak 100-year storm event with no detention basin upstream of Central Avenue (see Appendix "B").

According to hydrology calculations, the runoff created by the 100-year storm generates a flowrate of approximately 3,650 CFS for the existing channel (see Appendix "C"). Consequently, there are several areas within the existing channel that are grossly under-sized for this alternative. The following is a list of channel deficiencies for the area.

1. Existing RCB culvert at Dawsonia Street does not have an adequate approach apron to handle the existing flow.
2. Existing earthen channel near Audubon Court is under-sized
3. Existing graded pads for residences near Audubon Court are too low.
4. Existing triple 5' X 10' RCB culverts at Central Avenue is under-sized
5. Existing earthen channel along the north side of Central Avenue is under-sized

In order to convey runoff from the 100-year storm, these deficiencies will need to be addressed. For example, the existing channel will need to be widened in several areas and the existing concrete box culverts under Central Avenue will need expansion (see Appendix "B"). The following list is a brief description of improvements that will be required for these channel modifications and others.

1. Concrete channel apron will be required to transition from channel flow to box culvert flow under Dawsonia Street.
2. Channel grading upstream of Audubon Court
3. Parapet wall on north channel bank between Audubon Court and Central Avenue
4. Concrete box expansion under Central Avenue (additional 5~5'X12' RCB culverts)



5. Road reconstruction will be required for the expansion of the culverts.
6. Temporary detour road will be required during construction of the additional culverts.
7. Channel widening north of Central Avenue (55' base width)
8. Bridge replacements
9. Building relocation
10. Water lateral replacements

Regarding the channel design, this alternative should be limited to channels with a reinforced-turf lining primarily for aesthetic and environmental reasons. The channel along Central Avenue should be designed to approximate the flowline of the existing channel and stay below Central Avenue. Velocities must be kept below maximum velocities acceptable for reinforced turf lining, and the channel must be designed to meet the County of San Diego design standard minimum of 0.5-foot of freeboard.

This alternative would require extensive channel improvements and should be rejected for the following reasons:

1. It does NOT include a detention basin nor water quality treatment features.
2. It requires major improvements to Central Avenue.
3. It requires extensive traffic control.
4. It requires extensive acquisition of right-of-way and/or easements.
5. Requires concrete channel transition apron at Dawsonia Street
6. Requires concrete channel transition apron at Central Avenue

Other difficulties of construction for this alternative include maintaining the current vehicular access to adjacent residences.

### ***Alternative 2 - (600 CFS Design Q)***

Alternative 2 proposes to attenuate the 100-year flood event to a flow equivalent to the estimated capacity of the Sunnyside School pedestrian bridge ( $Q=600$  cfs). This alternative would require a relatively small channel along Central Avenue (base width 2.00 ft, depth 6.75 ft), and no further improvements downstream. However, Alternative 2 was determined to be infeasible because there is insufficient area upstream of Central Avenue to achieve the required detention volume. The size of detention basin required for this alternative is too large and would require massive grading and the acquisition of many properties and homes. Therefore, no further analysis was completed for this alternative.

### ***Alternative 3 - (1,600 CFS Design Q)***

Alternative 3 proposes to attenuate the 100-year flood event to a flow equivalent of the estimated capacity of the culvert under Central Avenue ( $Q=1,600$  cfs). This alternative would avoid upgrades to the Central Avenue culvert, but would require flow detention upstream. Alternative 3 requires a 20-foot high embankment around 14 acres of land north of Central Avenue. The channel

along Central Avenue would be expanded to a base width of 20 feet and a depth of 6.75 feet.

However, Alternative 3 is similar to Alternative 2 and was determined to be infeasible when it was apparent that the size of detention basin required for this alternative is too large and would require massive grading and the acquisition of too many properties and homes. Therefore, no further analysis was completed for this alternative.

#### ***Alternative 4 - (3,000 CFS Design Q)***

Alternative 4 proposes to utilize area available upstream of Central Avenue to the maximum extent for a proposed detention basin (see Appendix "B"). Consequently, land acquisition upstream of Corral Canyon Road will be required. This alternative uses logical topographic boundaries to limit grading efforts.

According to hydrology calculations, the volume available behind a 10-foot berm above Central Avenue will allow the 100-year peak to be reduced to approximately 3,000 cfs (see Appendix "C"). From a channel hydraulics perspective, this alternative is similar to Alternative 1 in that several areas within the existing channel are grossly under-sized. Consequently, the following list is a brief description of channel deficiencies for the area.

1. Existing RCB culvert at Dawsonia Street does not have an adequate approach apron to handle the existing flow.
2. Existing earthen channel near Audubon Court is under-sized
3. Existing graded pads for residences near Audubon Court are too low.
4. Existing RCB culvert at Central Avenue is under-sized
5. Existing earthen channel along the north side of Central Avenue is under-sized

In order to convey runoff from the 100-year storm (3,000 with detention), the preceding deficiencies will need to be addressed. For example, the existing channel will need to be widened in several areas and the existing concrete box culverts under Central Avenue will need expansion (see Appendix "B"). The following list is a brief description of improvements that will be required for these channel modifications and others.

1. Channel grading upstream of Audubon Court
2. Parapet wall on north channel bank between Audubon Court and Central Avenue
3. Concrete box expansion under Central Avenue (4~5'X12' RCB culverts)
4. Road reconstruction will be required for the expansion of the culverts.
5. Temporary detour road will be required during construction of the additional culverts.
6. Channel widening north of Central Avenue (45' base width)
7. Bridge replacements are required on three lots.
8. Building relocation is required on one lot.

9. Water lateral and meter replacements are required.

Regarding the channel design, this alternative should be limited to channels with a reinforced-turf lining primarily for aesthetic and environmental reasons. The channel along Central Avenue should be designed to approximate the flowline of the existing channel and stay below Central Avenue. Velocities must be kept below maximum velocities acceptable for reinforced turf lining, and the channel must be designed to meet the County of San Diego design standard minimum of 0.5-foot of freeboard.

This alternative will require extensive channel improvements and was considered and rejected for the following reasons:

1. It requires a narrower channel than Alternative 1
2. It requires one less RCB culvert than Alternative 1
3. It requires a detention basin.
4. It requires land acquisition over many properties east of Corral Canyon Road.
5. It requires major improvements to Central Avenue.
6. It requires extensive traffic control.
7. It requires the acquisition of right-of-way and/or easements.
8. Concrete channel transition apron at Dawsonia Street.
9. Concrete channel transition apron at Central Avenue.

Other difficulties of construction for this alternative include maintaining the current vehicular access to adjacent residences.

#### **Alternative 5 - (1,800 CFS Design Q)**

Alternative 5 proposes the construction of three basins upstream of Central Avenue (see Appendix "B"). This plan is similar to Alternative 4 in that it maximizes the available area, but is different in that the multiple basin plan relies on 'flow-by' type basins rather than one large 'flow-through' type basin. This alternative will require land acquisition upstream of Corral Canyon Road and uses similar logical topographic boundaries to limit grading efforts as in Alternative 4.

Alternative 5 is comprised of three parts, which might be phased in construction to provide interim levels of flood protection.

**Part 1** consists of two components: (1) a 25-acre-ft detention basin (Basin "A") immediately upstream of Central Avenue. The outlet structure for Basin "A" is a rectangular box culvert with three 4.5' ft rise by 6' span barrels. Basin "A" will be 16 ft deep; and (2) a vegetation-lined trapezoidal channel adjacent to Central Avenue, with a base width of 20 feet and a depth of approximately 7 feet, and a sideslope of 2H:1V. The top width of this channel will be approximately 50 feet. Together, the channel and basin of Part 1 will be able to attenuate a 10-year flood event (approximately 1,700 cfs) to the capacity of the culverts under Central Avenue (1,600 cfs).

**Part 2** consists of a second detention basin (Basin "B") upstream of Basin "A". Basin "B" will provide approximately 65 acre-feet of storage and will be 16.5 feet deep. Basin "B" is a 'flow-by' detention basin, with a 100-ft long side-weir inlet structure located parallel to the channel. The proposed outlet structure for Basin "B" will be a 9-ft high riser structure with a low-flow outlet. Together with the structures proposed in Part 1, Basin "B" will be able to attenuate a 25-year flood event (approximately 2,390 cfs) to the capacity of the culverts under Central Avenue (1600 cfs).

**Part 3** consists of a third detention basin (Basin "C") upstream of Basin "B" and an additional 5'x12' RCB culvert under Central Avenue. Basin "C" provides approximately 54 acre-feet of storage and will be 16.5 feet deep. Basin "C" is a 'flow-by' detention basin, with a 100-ft long side-weir inlet structure located parallel to the channel. The proposed outlet structure for Basin "C" will be a 10-ft high riser structure with a low-flow outlet. Together with the structures in Part 1 and Part 2, the basin and additional culvert under Central Avenue will be able to attenuate the 100-year flood event (approximately 3,650 cfs) to a peak flow of 1,800 cfs and safely convey the flow under Central Avenue.

The following list is a brief description of improvements that will be required for Alternative 5 channel modifications:

**Part 1**

1. Channel widening north of Central Avenue (20 ft base width)
2. Detention basin upstream of Central Avenue with (3) 4.5'x6' RCB outlet structure)
3. Bridge replacements are required on three lots.
4. Water lateral and meter replacements are required.
5. Concrete channel transition apron at Dawsonia Street.
6. Concrete channel transition apron at Central Avenue.

**Part 2**

7. Detention basin upstream with riser outlet structure

**Part 3**

8. Construction of basin and outlet structure
9. Additional 5'X12' RCB under Central Avenue
10. Road reconstruction will be required for the expansion of the culverts.
11. Temporary detour road will be required during construction of the additional culverts.

The channel design for this alternative should be limited to channels with a reinforced-turf lining primarily for aesthetic and environmental reasons. The channel along Central Avenue should be designed to approximate the flowline of the existing channel and stay below Central Avenue. Velocities must be kept below maximum velocities acceptable for reinforced turf lining, and the channel must be designed to meet the County of San Diego design standard minimum of 0.5-foot of freeboard.

**Advantages**

1. No improvements to Dawsonia Street culvert required.
2. No improvements to channel between Central Avenue and Dawsonia Street required.
3. Fewer RCB culvert improvements Central Avenue compared to Alternative 3 and Alternative 4.
4. Installation of Part 1 and Part 2 of project can provide 10-year or 25-year flood protection interim basis, respectively.

**Disadvantages**

1. Requires land acquisition for basins
2. Requires major improvements to Central Avenue
3. Requires extensive traffic control
4. Requires the acquisition of right-of-way and/or easements.
5. Other difficulties of construction for this alternative include maintaining the current vehicular access to adjacent residences.



## 6. FUNDING

Funding for the drainage and road improvements along Central Avenue may come from a number of sources.

For the construction along Central Avenue within road right of way, funding may be provided by California Gas Tax Program.

For the construction outside road right of way such as the detention basins upstream of Central Avenue and channel improvements downstream of Central Avenue, funding may be provided by the San Diego County Flood Control District.

Other possible sources of funding are developer fees, Community Development Block Grants (CDBG), or other state or federal grants.

## 7. OPINION OF PROBABLE PROJECT COST

A budgetary Opinion of Probable Construction Cost is detailed in Appendix "A" of this report. Based on the Construction Cost, the Total Budget Cost in Year 2002 dollars is as follows:

### ***Alternative 1***

Construction Costs	\$1,118,800
Administration	\$ 55,000
Construction Inspection	\$ 175,000
Design	\$ 110,000
Environmental	\$ 0
Materials Laboratory	\$ 20,000
Project Manager (3% of Construction Cost)	\$ 34,000
Right-of-Way	\$ 432,000
Survey (Design and Construction)	\$ 20,000
<b>Total Project</b>	<b>\$1,964,800</b>

### ***Alternative 2***

No costs are provided for this alternative.

### ***Alternative 3***

No costs are provided for this alternative.

### ***Alternative 4***

Construction Costs	\$3,713,500
Administration	\$ 95,000
Construction Inspection	\$ 225,000

Design	\$ 160,000
Environmental	\$ 0
Materials Laboratory	\$ 30,000
Project Manager (3% of Construction Cost)	\$ 111,000
Right-of-Way	\$3,617,000
Survey (Design and Construction)	\$ 40,000
<b>Total Project</b>	<b>\$7,991,500</b>

#### ***Alternative 5***

Construction Costs	\$2,771,100
Administration	\$ 95,000
Construction Inspection	\$ 225,000
Design	\$ 160,000
Environmental	\$ 0
Materials Laboratory	\$ 30,000
Project Manager (3% of Construction Cost)	\$ 83,000
Right-of-Way	\$3,589,000
Survey (Design and Construction)	\$ 40,000
<b>Total Project</b>	<b>\$6,992,100</b>

### **8. SCHEDULE**

#### ***Alternatives 1***

<b><u>Item</u></b>	<b><u>Duration</u></b>
Design and Environmental	24 months
Survey (Design and Construction)	1 month
Right-of-Way Acquisition	9 months
Construction	10 months
<b>Total Duration</b>	<b>44 months</b>

#### ***Alternatives 2 and 3***

No schedule estimate provided for these alternatives

#### ***Alternative 4***

<b><u>Item</u></b>	<b><u>Duration</u></b>
Design and Environmental	24 months
Survey (Design and Construction)	2 months
Right-of-Way Acquisition	12 months
Construction	12 months
<b>Total Duration</b>	<b>50 months</b>



### ***Alternative 5***

<b><u>Item</u></b>	<b><u>Duration</u></b>
Design and Environmental	24 months
Survey (Design and Construction)	2 months
Right-of-Way Acquisition	12 months
Construction	12 months
<b>Total Duration</b>	<b>50 months</b>

## **9. RECOMMENDATION**

Due to flooding problems that have been experienced along Central Avenue, flood control improvements are recommended. Furthermore, it is apparent that the drainage solution will require detention of runoff in addition to drainage channel improvements.

Alternative 1 requires too much right-of-way acquisition along Central Avenue and the disadvantages out-weigh the benefits. Alternatives 2 and 3 require too much land acquisition for detention basins upstream of Corral Canyon Road. Although Alternative 4 maximizes the land acquisition for detention basins, it does not attenuate enough of the 100-year storm to be feasible.

Due to the ability to phase construction, and the addition capacity of building a channel "flow-by" system, Alternative 5 is recommended for the flood control improvements. Alternative 5 can be phased to accommodate the 10-year, 25-year, and 100-year storms. In addition, the acquisition of land required for Alternative 5 can be phased to match the phase of flood improvements. Lastly, Alternative 5 gives the adjacent properties immediate relief of flooding from annual storms, while improvements in the future are planned to handle the larger storms in excess of the 10-year storm.

**10. PROJECT PERSONNEL**

**Project Manager**

Mark Perrett, PE

(858) 694-2693

**Project Engineer**

Kent Burnham, PE

(858) 694-2734

**DPW Manager – Design**

Joe McDivitt, PE

(858) 694-2691

**DPW Manager – Environmental Services**

Nelson Olivas

(858) 874-4005

# Appendix A

---

# Appendix B

---